CLAIMS

What is claimed is:

1. A magnetic memory comprising:

a plurality of magnetic elements, each of the plurality of magnetic elements including a free layer and a spacer layer; and

a plurality of reference layers, each of the plurality of reference layers coupled with a corresponding portion of the plurality of magnetic elements, the plurality of reference layers being ferromagnetic, a portion of each of the plurality of reference layers functioning as at least a portion of a pinned layer for each of the corresponding portion of the plurality of magnetic elements and as a write line for the corresponding portion of the plurality of magnetic elements, the spacer layer residing between the free layer of each of the plurality of magnetic elements and the reference layer.

2. The magnetic memory of claim 1 wherein each of the plurality of magnetic elements is a magnetic tunneling junction and wherein the spacer layer is a tunneling layer.

3. The magnetic memory of claim 1 wherein the plurality of reference layers has a first width and the plurality of magnetic elements has a second width.

4. The magnetic memory of claim 3 wherein the first width is less than the second width.

5. The magnetic memory of claim 3 wherein the first width is the same as the second width.

6. The magnetic memory of claim 1 wherein each of the plurality of magnetic element further includes a soft ferromagnetic layer, the soft ferromagnetic layer residing between the spacer layer and the reference layer.

7. The magnetic memory of claim 6 wherein the free layer further includes a first ferromagnetic layer having a first magnetic vector, a second ferromagnetic layer having a second magnetic vector, and a nonmagnetic spacer layer between the first ferromagnetic layer and the second ferromagnetic layer, the nonmagnetic spacer layer being configured such that the first ferromagnetic layer and the second ferromagnetic layer are magnetostatically coupled so that the first magnetic vector and the second magnetic vector are antiparallel.

8. The magnetic memory of claim 1 further comprising:

a plurality of isolation devices for the plurality of magnetic elements.

9. A method for providing magnetic memory comprising:

(a) providing a plurality of magnetic elements, each of the plurality of magnetic elements including a free layer and a spacer layer; and

(b) providing a plurality of reference layers, each of the plurality of reference

layers coupled with a corresponding portion of the plurality of magnetic elements, the plurality of reference layers being ferromagnetic, a portion of each of the plurality of reference layers functioning as at least a portion of a pinned layer for each of the corresponding portion of the plurality of magnetic elements and as a write line for the corresponding portion of the plurality of magnetic elements, the spacer layer residing between the free layer of each of the plurality of magnetic elements and the reference layer.

10. The method of claim 9 wherein each of the plurality of magnetic elements is a magnetic tunneling junction and wherein the spacer layer is a tunneling layer.

11. The method of claim 9 wherein the plurality of reference layers has a first width and the plurality of magnetic elements has a second width.

12. The method of claim 11 wherein the first width is less than the second width.

13. The method of claim 11 wherein the first width is the same as the second width.

14. The method of claim 9 wherein the plurality of magnetic elements providing step further includes the steps of:

(a1) for each of the plurality of magnetic elements, providing a soft ferromagnetic

layer, the soft ferromagnetic layer residing between the spacer layer and the reference layer.

15. The method of claim 14 wherein the plurality of magnetic element providing step (a) further includes the step of:

(a2) for the free layer, providing a first ferromagnetic layer having a first magnetic vector, a second ferromagnetic layer having a second magnetic vector, and a nonmagnetic spacer layer between the first ferromagnetic layer and the second ferromagnetic layer, the nonmagnetic spacer layer being configured such that the first ferromagnetic layer and the second ferromagnetic layer are magnetostatically coupled so that the first magnetic vector and the second magnetic vector are antiparallel.

16. The method of claim 14 wherein the plurality of magnetic element providing step (a) further includes the steps of:

(a2) defining the plurality of magnetic elements after the soft magnetic layer has been provided.

17. The method of claim 9 further comprising the step of:

(c) providing a plurality of isolation devices for the plurality of magnetic elements.